

S/N 09/302,154  
Docket: YO999-214

5. (New) The program storage device of claim 1, wherein said evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint comprises:

a2 performing a test whose outcome is not equivalent to a comparison between the number of training records of at least one species of training records belonging to the segment and a numerical quantity that is selectively dependent on the combination of species of training records being considered but otherwise constant for all generated segments that are evaluated.

### REMARKS

Attached hereto is a marked up version of the changes made in the specification and claims by the current Amendment. The attached page is captioned "Version with markings to show changes made."

Claims 1-5 are all of the claims pending in the present Application. New claim 5 has been added. Claim 1 stands rejected under 35 USC §112, second paragraph, as being indefinite. Claims 1-4 stand rejected under 35 USC §103(a) as unpatentable over US Patent 5,890,129 to Apte et al., further in view of US Patent Application Publication No. US 2001/0020229 to Lash.

These rejections are respectfully traversed in view of the following discussion.

### **I. THE CLAIMED INVENTION**

As described and claimed (e.g., by independent claim 1), the present invention is directed to a program storage device readable by a machine for constructing

S/N 09/302,154

Docket: YO999-214

segmentation-based models that satisfy constraints on the statistical properties of the segments, including presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data.

The generating includes performing an optimization that includes generating alternate training data segments and associated segment models, evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint, and selecting a final plurality of segment models and associated segments from among the alternates evaluated that have satisfactory evaluations.

An advantage of the present invention is that manual exploration of potential risk factors is replaced with automated search, thereby enabling highly predictive risk models to be developed in a matter of weeks or days, rather than years.

## **II. THE 35 USC §112, First Paragraph, Rejection**

The Examiner rejects claim 2 as being indefinite. Applicant assumes that the Examiner is actually referring to claim 1, since it is the only claim having the language to which the Examiner finds objectionable.

Applicant has removed this phraseology from independent claim 1 and added a new dependent claim 5 with this claim limitation. Applicant responds to the Examiner's concern about negative limitations by pointing to MPEP 2173.05(i) in which such limitations are indeed permitted under the current view of the courts. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection.

## **III. THE PRIOR ART REJECTION**

The Examiner asserts that US Patent 5,970,464 to Apte et al. teaches the present invention, but additionally concedes that the primary reference "fails to expressly disclose 'a

S/N 09/302,154  
Docket: YO999-214

program storage device readable by a machine tangibly embodying a program of instructions' in the preamble."

To overcome this deficiency, the Examiner then introduces US Patent Application Publication No. US 2001/0020229 to Lash. The Examiner further asserts that one of ordinary skill in the art would have been motivated "to expand Apte's computer-implemented method of underwriting profitability analysis to include a program storage unit, which may incorporate one or more conventional storage devices adapted to read programming data, as taught by Lash, with the motivation of providing means for storage and retrieval of program data and instruction to be used at a later time". Applicant respectfully disagrees.

Applicant first respectfully traverses the Examiner's characterization of the preamble phrase can be overcome by merely adding conventional storage devices. A more realistic articulation of the deficiency of the technique taught in the Apte reference compared to the present invention is that, in the prior art reference, considerable end user interaction (see next-to-final sentence in Abstract; also, disclosure at column 4 at lines 28-40) with the program is required before the "segments that are dragging the overall loss down are satisfactorily removed" (column 4 at lines 36-37).

In complete and fundamental contrast, the present invention overcomes this reliance on a human operator who is interacting with the computer to develop a model by totally automating the process described (see specification page 2 at lines 23-24, compared to page 3 at lines 7-18, and, especially, page 25 at lines 11 and 12).

Thus, the deficiency addressed by the Examiner in the rejection is actually the difference between constructing segmentation-based models with human assistance versus a totally-automated construction as executed by a computer. Thus, Apte is clearly deficient in teaching or suggesting the invention.

Further, even assuming *arguendo* that the Lash reference provides a totally-automated method to identify patients at risk, the Examiner is not justified to assert that the existence of a totally-automated method to identify patents at risk teaches one of ordinary skill in the art how to modify the technique taught in the Apte reference to eliminate the human interaction required to complete the modeling technique described therein. Indeed, Lash has nothing to do with the environment, let alone the problems addressed by Apte.

S/N 09/302,154  
Docket: YO999-214

Therefore, Applicant first respectfully asserts that the Examiner has failed to overcome the deficiency identified in the rejection.

Hence, turning to the clear language of the claims, there is no teaching or suggestion in the Apte reference of "... [a] program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments ...", as required by claims 1-3. Similar language is in claim 4. Lash does nothing to make up for this deficiency.

Accordingly, for this reason alone, claims 1-5 are fully patentable over the Apte reference.

#### **IV. Formal matters and Conclusion**

In view of the foregoing, Applicant submits that claims 1-4, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

S/N 09/302,154  
Docket: YO999-214

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: 07/23/02

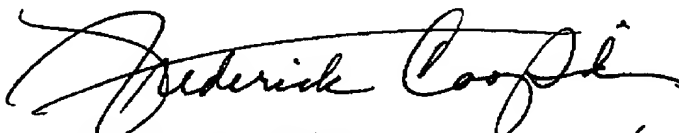


Frederick E. Cooperrider  
Reg. No. 36,769

**McGinn & Gibb, PLLC**  
8321 Old Courthouse Road, Suite 200  
Vienna, Virginia 22182  
(703) 761-4100  
**Customer No. 21254**

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 746-7238 this Amendment under 37 CFR §1.111 to Examiner M. Kapadia on July 23, 2002.



Frederick E. Cooperrider  
Reg. No. 36,769

07/23/02

S/N 09/302,154

Docket: YO999-214

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

**Claims 1-4 have been amended, as follows:**

1. (Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method [steps] for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments, the method [steps] comprising:

(1) presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict; and

(2) generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data, [the step of] said generating comprising performing optimization [steps] comprising:

a) generating alternate training data segments and associated segment models;

b) evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint [comprising a test whose outcome is not equivalent to a comparison between, on the one hand, the number of training records of at least one species of training records belonging to the segment and, on the other hand, a numerical quantity that may depend on the combination of species of training records being considered but that is otherwise constant for all generated segments that are evaluated]; and

c) selecting a final plurality of segment models and associated segments from among the alternates evaluated that have satisfactory evaluations.

2. (Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method [steps] for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments, the method [steps] comprising:

(1) presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding output value(s) that the model is intended to predict; and

(2) generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data, [the step of] said generating comprising performing optimization [steps] comprising:

a) generating alternate training data segments and associated segment models using statistical constraints to guide the construction of the data segments in a closed-loop fashion so as to ensure that the resulting data segments satisfy the statistical constraints; and

b) selecting a final plurality of segment models and associated segments from among the alternates generated.

3. (Amended) A program storage device readable by a machine, tangibly embodying a program instructions executable by the machine to perform a method [steps] for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments, the method [steps] comprising:

S/N 09/302,154

Docket: YO999-214

(1) presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict; and

(2) generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data, [the step of] said generating comprising:

a) generating alternate pluralities of data segments and associated segment models;

b) adjusting the alternate pluralities so that the resulting data segments satisfy the statistical constraints.

4. (Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method [steps] for constructing segmentation-based models of insurance risks, the method [steps] comprising:

(1) presenting a collection of training data comprising examples of historical policy and claims data; and

(2) generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data, [the step of] said generating comprising performing optimization [steps] comprising:

a) generating alternate training data segments and associated segment models;

b) evaluating the generated segment models using numerical criteria derived from statistical models used by actuaries to model insurance risks, and

c) selecting a final plurality of segment models and associated segments from among the alternates generated so as to optimize aggregate numerical criteria for the plurality.

**The following new claim 5 has been added:**

5. (New) The program storage device of claim 1, wherein said evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint comprises:

performing a test whose outcome is not equivalent to a comparison between the number of training records of at least one species of training records belonging to the segment and a numerical quantity that is selectively dependent on the combination of species of training records being considered but otherwise constant for all generated segments that are evaluated.

To: Examiner M. Kapadia

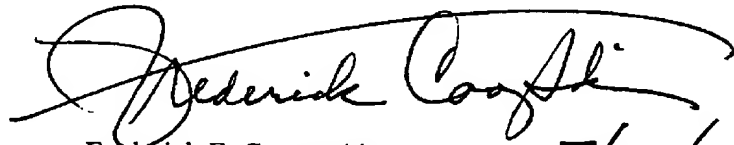
Fax No.: (703) 746-7238

Re: Amendment for S/N 09/302,154

From: F. Cooperrider  
McGinn&Gibb, PLLC  
Email: fcooperrider@aol.com  
Phone: (703) 761-2377

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 746-7238 this Amendment under 37 CFR §1.111 to Examiner M. Kapadia on July 23, 2002. Also faxed is an Appointment of Associate Attorney, appointing McGinn&Gibb, PLLC, as an associate attorney.



Frederick E. Cooperrider  
Reg. No. 36,769

7/23/02

**(This Cover Page + 12 Pages)**